

### REMARKS

Favorable reconsideration of this application as presently amended and in light of the following discussion is respectfully requested. Claims 1-5 are pending, Claims 1 and 4 having been amended, and Claim 5 having been added by way of the present amendment.

In the outstanding Office Action Claims 2-3 were indicated as being unpatentable over Grand et al. (JP 411218639, hereinafter Grand); Claim 3 was rejected as being unpatentable over Grand in view of Inoue et al. (U.S. Patent No. 5,546,483, hereinafter Inoue); and Claim 4 was indicated as containing allowable subject matter.

Applicants appreciatively acknowledge the identification of allowable subject matter.

In reply, Claim 1 has been amended to clarify patentably distinctive features over the asserted prior art. In particular, Claim 1, as amended, is directed to an optical waveguide circuit that includes a substrate having a cleavage plane where the cleavage plane is formed at least one of horizontally and perpendicularly to an orientation flat. The optical waveguide circuit also includes an incision line constructed by a groove or/and a separating slit formed by crossing at least one portion of a core of the waveguide. A face of the incision line is formed at an arbitrary angle with respect to the cleavage plane of the substrate.

These features recited in amended Claim 1 are based on observations made by the present inventors to improve a performance of optical waveguide circuits. Moreover, the present inventors recognized that a problem with conventional optical waveguide circuit devices is that there is a possibility that the devices will crack when dropped (see, e.g., specification page 3, first full paragraph). Moreover, the present inventors noticed that a positional relationship of the cleavage plane of the substrate and an element such as a groove, formed on the substrate results in variations of the structural integrity of the device depending on the relationship between the faces of the groove and the separating slit with regard to the cleavage plane of the substrate (see, e.g., specification page 4. The present inventors further

recognized that when the faces of the groove and the slits are set to be faces not conforming to the cleavage plane of the substrate, the cracks do not arise as is the case with conventional devices when an impact is applied to the device. Based on this recognition of the source of the cracking problem, the relative orientation of the incision line and the cleavage plane relative to the orientation flat, the present inventors identified a solution to the cracking problem, as reflected in the pending claims.

Although the outstanding Office Action refers to Grand, and offers to provide an official PTO English translation of Grand, Applicants note that a corresponding English language version of Grand is also found as U.S. Patent No. 6,222,963 (a cumulative reference with regard to the Japanese version of Grand, namely JP 411218639A). Grand describes a phased array device in which multiple pieces formed on the substrate may be obtained. (Grand, column 5, lines 55-56.) Grand describes that the substrates on which the pieces are made can be cleaved along crystallographic substrate planes (column 8, lines 10-14). Grand also explains however that sawing is preferable to cleavage since sawing does not induce any constraints on the shape of the device (column 8, lines 25-28). In contrast, “cleavage necessitates right angles almost everywhere” (column 8, lines 27-28).

In contrast to the presently claimed invention, Grand offers no description of a cleavage plane and an incision line to be different. Moreover, Grand does not describe a cleavage plane in detail at all. The present invention however, explains that the cleavage planes are formed at least one of horizontally and perpendicularly to the orientation flat, and that a face of the incision line is formed at an arbitrary angle with respect to the cleavage plane of the substrate. Grand neither teaches nor suggests this feature as Grand suggests the use of “sawing” in order to obtain different shaped pieces, and views cleavage as necessitating right angles “almost everywhere”. The cleavage plane formed horizontally or perpendicularly to the orientation flat and the incision line, as claimed, are different from one

another in the presently claimed invention. However, in Grand, the cleavage plane and the incision line are set to be the same. Further, in Grand, there is a description that the respective pieces can be obtained by cutting. However, in Grand, there is no description that the cutting is performed by differently setting the cleavage plane and the incision line.

In view of the above description and differences between the presently claimed invention and Grand, it is respectfully submitted that independent Claim 1, as amended, patentably defines over Grand. For substantially the same reasons it is respectfully submitted that Claim 2 and newly added Claim 5 also patentably define over Grand.

With regard to Claim 3, it is respectfully submitted that the features in Inoue, as asserted in the outstanding Office Action, do not cure the deficiencies with regard to Grand as applied to Claim 1 discussed above. Accordingly, it is respectfully submitted that whether taken individually or in combination, Grand in view of Inoue neither teaches nor suggests the invention defined by Claim 3.

Consequently, in view of the present amendment and in light of the foregoing comments, it is respectfully submitted that the invention defined by Claims 1-5 as amended is patentably distinguishing over the prior art. The present application is therefore believed to be in condition for formal allowance and an early and favorable reconsideration of this application is therefore requested.

Respectfully submitted,

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